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EDITORIAL

"A Revival in School Spirit"

In years gone by, the Medical School on this campus had more spirit and fight than any faculty in the University of Toronto. However, as time has passed, we have slipped from that enviable position and gradually lost our unbounding enthusiasm for our faculty.

Medical functions are, for the most part, poorly attended: our own Arts and Letters Club is attended mainly by members of other faculties; our athletic teams go into the field unsupported by cheering spectators of their own faculty—on occasions, scheduled Medical teams do not even appear. All this can be accounted directly upon a lack of spirit in every one of us to a varying degree.

Most of us are aware of this lack in the present-day Medical student, but few of us are certain why the spirit lack is so obvious. One part of the answer can be traced to the war, which has forced us, and rightfully so, to curtail many of our faculty activities; but we cannot name this single cause as the entire reason.

The answer to our present condition lies within the students and within their Medical teachers. With this point clearly in mind, let us analyse the teacher-student situation.

Looking firstly at the student aspect: it must be obvious to everyone that only when the student has gained an interest in his faculty will he have the desire

to become an active part in all its undertakings. Therefore, we must take the starry-eyed impressionable freshmen in the first days of their medical careers, that is, at initiation time. In the last four years, due to senseless restrictions imposed, over and above those of the war, freshmen have been subjected to a period of physical violence which has had no effect in initiating them into the Medical faculty but has merely made them long for another year so that they, in their turn, may drub another freshman group. Thus our first grand opportunity to mould the Medical student and to make him conscious of his faculty has been lost.

Our next chance to work with incoming students is in the teaching of our faculty songs, yells and cheers. Here we fail again, for few freshmen ever learn these songs, due to the fact that the seniors do not know them fluently enough to teach them. The end result is a pitiful cry when put against an Engineers' "Toike Oike." In the immediate future, either we must learn our faculty songs and be ready to teach them to incoming freshmen, or, if ashamed of our School contributions, new and better ones must be written to emphasize the spirit and ideals of our Medical College.

Next, we come to faculty-sponsored social events in the life of a Medical student, which are, for the most part, the Meds' At-Home and the now extinct Daffodil Night. The former has, in the past, been a most enjoyable gathering where, once a year, Medical students and some of their professors gathered to be entertained. It was here that the freshman became increasingly aware of his importance and position in the Medical School. However, in the past few years, misguided groups of students have taken it upon themselves to produce an intermission skit, which succeeded in running boringly overtime and also succeeded in being so "off colour" that not only professors but students left the hall in disgust, where enthusiasm for the gathering and what it represented should have been foremost in everyone's mind.

A new and exceedingly well organized Medical Society has become aware of the spiritless effort of our students, and they have, on their part, taken strong steps to "inject" some life into these students. They have undertaken to return Daffodil Night to our campus next year. This ray of hope is, indeed, a strong point in which the Medical student may look as the beginning of a sincere effort to make him acutely aware of his faculty.

We cannot blame the student entirely for lack of enthusiasm in his faculty when so little encouragement is offered by his teachers and professors. In Engineering, Arts, or any faculty, *rapprochement* between teacher and student is excellent, in fact, one always sees a few faculty members at all important games or social functions participated in by their respective colleges. In other words, interest and student encouragement does not end in the classroom, but is strongly evident extra-curricularly.

In the Faculty of Medicine, with a few highly appreciated exceptions, the teachers seem to lose all interest in students once they have left the classroom. Seldom is counsel given a needy student; encouragement is rarely forthcoming; and to see a professor from the Faculty of Medicine at a Medical athletic undertaking is unheard of.

We realize that upon our teachers the war has imposed a tremendous strain—

the effort they have put forth to teach us has been without comparison—but surely they cannot be so busy that an hour could not be appropriated once a year to watch a championship Meds' team in action, or take a few minutes "after school" to help solve a few problems of the students.

If the teachers and heads of our faculty would give the students some form of encouragement in their undertakings and accomplishments, the change in the student's interest, not only in his work but also in his faculty, would be revolutionary.

In conclusion, let us summarize:

The Problem:

To revive the Medical student's interest and pride in his faculty.

The Answer:

(a) Concerning the students—

- (i) A sensible initiation to arouse the freshman's interest in his faculty.
- (ii) To teach freshmen, the songs, yells and cheers of the Medical faculty. If deemed inadequate, new Medical yells should be written.
- (iii) Organization of social functions, so that the students are entertained correctly, thereby further increasing their interest in their faculty.

(b) Concerning the teachers and professors—

- (i) Encourage the students in every possible way. In this case, a little effort goes a long way.
- (ii) Show more than professional interest in the students, and try to attend at least some of their athletic and social functions.

We feel sure that if this program were to be carried out the spirit and pride of every student in the Medical faculty would change miraculously, giving results never dream of!

It is with deep regret that we record the death of Miss Wilma Jones on March 21st, 1945.

Miss Jones was a member of the staff in the Medical Office for twenty-seven years. She was sincerely interested in the students and gave generously of her time to their activities and problems. The Faculty of Medicine have suffered a real loss and her cheerful presence and ready welcome will be greatly missed.

CLINICAL DIAGNOSIS OF TUMORS OF THE BREAST

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When confronted with a topic as large as Tumors of the Breast, it is necessary to confine the subject in some way in order to discuss it intelligently in a short paper. Consequently, I have chosen to limit this article to the three common tumors of the breast, which I believe constitute the greatest problem from the point of view of clinical differentiation. These three are: fibrocystic disease of the breast, otherwise known as chronic cystic mastitis or lobular hyperplasia; fibroadenomata; and carcinomata.

Age Incident

Fibroadenomata are benign neoplasms of the breast which may occur at any age between puberty and the menopause. They occur chiefly in the younger age groups, between 20 and 40, and are the commonest cause of a lump in the breast when complained of by a girl in her late teens and twenties.

Chronic cystic mastitis nowadays frequently goes by the name of lobular hyperplasia. There are many divergent theories and opinions with regard to its etiology and also respecting its relationship to the incidence of carcinoma of the breast. It is undoubtedly a very common condition and occurs chiefly during the age of maximal reproductive activity. It does, however, overlap the age incident of carcinoma, and, being a very common lesion, it is not surprising that carcinoma not infrequently is accompanied by chronic cystic mastitis. The present-day teaching is that there is no other relationship between chronic cystic mastitis and carcinoma than this overlap in age incident. In other words, carcinoma is no more frequently observed

with chronic cystic mastitis than without it.

Carcinoma of the breast may occur at any age past puberty. It is, of course, most common in the carcinoma age group of 40 to 65. It is very unwise, however, to assume because a patient is under 40 years of age that a lump in her breast may not be carcinoma.

Symptoms:

The most common first complaint of a patient with a tumor in the breast is the observation of a lump. This is almost always the *only* symptom in the case of benign fibroadenoma. In carcinoma and chronic cystic mastitis the lump *may* be the only symptom. The lump of which the patient complains in fibroadenoma and carcinoma always remains in the same spot. On the other hand, in lobular hyperplasia, the patient may state that the lump appears and then varies in size and may have disappeared and reappeared in another portion of the breast.

Neuralgic pain associated with a lump in the breast is most commonly seen in patients who have chronic cystic mastitis. This pain is usually worse at the time of the menstrual periods and may radiate up into the axilla or about the chest wall. In fibroadenoma and carcinoma pain is a rare symptom and usually appears only when the patient, having discovered the lump, has been palpating it frequently and becomes hyperconscious of its presence.

Discharge from the nipple is never seen in patients with fibroadenoma. This symptom is usually associated with a duct carcinoma or a duct papilloma. In both these cases the discharge is usually bloody

in character. However, lobular hyperplasia may also give rise to discharge from the nipple, in this case usually being of a serous nature.

Changes in the skin of the breast are never seen in chronic cystic mastitis or fibroadenoma. But skin changes can occur in carcinoma of the breast. Padget's disease is the name applied to a characteristic weeping eczema of the areola surrounding the nipple. There are several theories as to the cause of Padget's disease, the commonest one being that it is due to obstruction of the lymphatics draining the skin by underlying malignant disease. The skin lesion thus results from lymphoedema. It is hard to explain why the Padget's disease always occurs about the nipple when the carcinoma sometimes lies quite peripherally in the breast. However, such a weeping eczema of the skin about the nipple is almost invariably associated with underlying carcinoma.

The presence of a lump in the axilla may rarely be the first thing noticed by the patient in carcinoma of the breast. This symptom is rarely observed by the patient in a case of chronic cystic mastitis and never occurs in fibroadenoma of the breast.

Physical Findings on Inspection

The first step in the examination of a patient complaining of a lump in the breast is to have her sitting up with both breasts exposed to a good light and then observe anything unusual about the appearance of either breast or any asymmetry. In any of the three conditions which we are discussing a visible tumor may sometimes be present.

Distortion of the nipple occurs in fibroadenoma and chronic cystic mastitis only in the case of very large tumors. On the other hand, some change in the axis of the nipple is frequently observed in carcinoma

even while the tumor is still small. The nipple may be inverted or retracted at one margin or pulled toward one quadrant of the breast.

Some change may be observed in the way one breast hangs or in its outline in silhouette. This frequently takes the form of a bulging of the outline in the case of large fibroadenoma or a large cyst. In carcinoma the tumor may actually make the affected breast seem smaller than the opposite normal breast, and sometimes one portion of the breast may be indrawn overlying the carcinoma.

Dimpling of the skin is never observed in fibroadenoma or chronic cystic mastitis, but it occurs not infrequently in the later stages of carcinoma, particularly when such tumor is superficially situated. *Peau d'orange* may be observed in the skin overlying a carcinoma. This is a condition in which the hair follicles become unusually pronounced and the common explanation is that it is due to a thickening of the skin due to lymphoedema from obstruction of the deeper lymphatics.

Gross skin changes are very rarely observed in fibroadenoma or chronic cystic mastitis but are sometimes present in carcinoma in the form of Padget's disease or eczema of the skin about the nipple or nodular infiltration of the skin in very advanced carcinoma.

Having made all these observations with the patient sitting erect, it is now wise to have her lie down and place both hands beneath her head so as to throw out the chest and make the breasts more prominent.

Physical Findings on Palpation

The fibroadenoma is characterized by the smoothness of its surface. It may be perfectly round or oval or may be smoothly lobulated. Always its edges and surfaces are very distinct and it is freely

movable within the substance of the breast. It may occur anywhere in the breast and is usually of a firm and rubbery consistency but is not as stony hard as carcinoma and does not give any sensation of being cystic. It is never related to the duct system leading to the nipple nor fixed to the deep fascia or skin. It occurs as a rule in breasts which are otherwise normal. Occasionally, more than one fibroadenoma may be present in the same patient. There is never any enlargement of the axillary glands.

In lobular hyperplasia the lump for which the patient consults the doctor is often a large cyst occurring in a breast which is the seat of diffuse chronic cystic hyperplasia. Consequently, upon examining such a patient, one almost always finds that both breasts have a ropey, nodular consistency. The lump of which the patient complains may be smoothly rounded if it is a single large cyst, but if, as is usually the case, it is a cyst occurring in an area of marked fibro-cystic hyperplasia, the margins of the lump will be somewhat indistinct, fading off into the surrounding breast tissue. Sometimes the breasts are relatively normal on palpation except for a pie-shaped segment in which the tumor of which the patient complains occurs. The consistency of the lump in chronic cystic mastitis is again, not stony hard as in carcinoma, but may be actually fluctuant. More commonly, however, it is quite firm, due to the tenseness of its fluid content. Because the lump is usually a cyst or a distended duct, the tumor is frequently related to the nipple and moves when the nipple is pulled. Also, because of the underlying pathology of the lesion, it is not uncommon to find other lumps which the patient had not noticed in the case of chronic cystic mastitis. Usually in such cases multiple small glands can be palpated in both axillae. These are not

stony hard but are relatively soft and are very frequently bilateral.

A carcinomatous lump in a breast never has a smooth outline but is always irregularly nodular. Its margins are very indistinct, fading off into the surrounding breast tissue. The tumor is usually stony hard in consistency. Carcinoma may occur in any of the four quadrants of the breast but the upper outer quadrant of the breast is most commonly the location. The second most common site is about the nipple or deep to the nipple. The two lower quadrants of the breast are the least common sites of primary carcinoma. Carcinomata of the breast have almost always either arisen from or invaded and fixed some portion of the duct system. Consequently, unless they are very peripheral in location, there will be a relationship to the nipple, and when one tugs upon the nipple the tumor is made to move. In carcinoma of the breast very rarely is more than one tumor palpable in the breast unless chronic cystic mastitis is an associated condition. In this case if one palpates the breast with the flat of the hand, usually only the carcinomatous mass remains palpable to the palm. This is one means of distinguishing between tumors of the breast which are malignant and ones which are cysts in the presence of a chronic cystic mastitis. Fixation of the tumor to the deep fascia, and indrawing, retraction or induced dimple of the overlying skin, as well as palpable secondaries in the axilla, are, of course, late signs of carcinoma of the breast. Fixation of the skin to the tumor may not be visible on simple inspection but can sometimes be induced by squeezing the skin about the lump in a centripetal direction toward the tumor. This makes evident the attachment of the skin to the tumor as a dimpling in the centre of the heaped-up relaxed skin. There are only three causes of such induced dimp-

ling of the skin. These are carcinoma, a granulomatous lesion such as actinomycosis or tuberculosis, and fat necrosis. Granulomatous lesions and fat necrosis are very rare in the breast in comparison with the incidence of carcinoma.

Transillumination and Aspiration

An attempt should always be made to transilluminate any palpable lump in the breast. Fibroadenomata and carcinomata, being solid tumors, do not transilluminate. But if the mass is due to a large cyst, as in the presence of chronic cystic mastitis, transillumination may be positive, particularly if the cyst is relatively superficial in location in the breast.

Another means of examination, which is always justified unless the tumor is obviously a carcinoma, is to attempt to aspirate a lump which is felt in the breast. If one puts some local anaesthetic into a 2 cc syringe and attaches an ordinary intravenous needle, the skin and overlying breast tissue can be anaesthetised as the needle is inserted towards the lump. One then thrusts the needle into the centre of the palpable lump which is steadied by the fingers of the opposite hand. If the tumor is a solid lump, as for example in fibroadenoma, no fluid can be aspirated. If on the other hand the tumor is cystic, fluid is freely aspirated. In the cysts of chronic cystic mastitis the fluid which is obtained is a clear serous one, often showing the shimmering crystals of cholesterol. By continuing the aspiration one can often completely empty these cysts and consequently cure the patient of her lump in the breast. If the fluid which was obtained is not clear serous fluid but is blood stained, then one may be dealing either with a duct papilloma or a duct carcinoma in the wall of the serous cyst. Consequently the aspiration of bloody fluid from a lump in

the breast is indication for further investigation.

Treatment

It is my belief that all lumps in the breast should be removed surgically with two exceptions. The first exception is the tumor that can be made to disappear completely by aspiration and in which the fluid obtained is not bloody. The second is the obvious case of carcinoma with demonstrable secondaries in the spine, nodules in the liver or enlarged palpable supraclavicular lymph glands. The latter is primarily radiological as far as treatment is concerned, although subsequent radical mastectomy may become feasible after x-ray treatment, or simple mastectomy may be indicated to remove a nasty fungating, ulcerated painful primary.

The reason I make this sweeping statement is because if the fluid aspirated from a lump in the breast is bloody, that lump may either be a duct papilloma in the wall of a serous cyst which condition is definitely pre-cancerous, or it may be due to cystic degeneration in a carcinoma.

On the other hand if no fluid is removed and the tumor is solid, it must either be a carcinoma or fibroadenoma or other rare type of tumors indistinguishable from carcinoma or fibroadenoma except by histological section. Now fibroadenomata get steadily larger. Three to four per cent of them undergo sarcomatous change when they have been present some years. Also the presence of a lump in the breast is always a source of worry to a nervous patient, particularly if there is any carcinoma in the family history. For this reason I believe that even an apparently obviously benign tumor of a freely mobile nature, smooth or smoothly lobulated, even in young patients in their teens or early twenties should be removed.

Another reason for this apparently radical attitude is that no matter how skilled or how experienced one may become, there is always the possibility that one is wrong in the clinical diagnosis of benign tumor. For this reason also, I believe that all lumps being removed from the breast should be operated upon with the patient prepared for radical mastectomy, and a quick section should be obtained while the patient is still under the anaesthetic if at all possible. To re-

move a lump from the breast without quick section, and have the report come back "carcinoma" the next day, is to cut that patient's chances of a ten year cure by approximately twenty-five per cent. Consequently, to assure the patient of the benefit of the doubt and give her the best chance of the earliest most effective treatment, all tumors of the breast should be operated upon with the idea that they may definitely be carcinoma.

SOME IMPORTANT POINTS IN THE ANATOMY OF THE OCULOMOTOR NERVE

ERIC A. LINELL M.D. Ch. B. Manc.

Gross Anatomy

The oculomotor nerve arises in a series of nuclei of motor nerve cells which lie in the gray matter ventral to the upper part of the aqueduct of the midbrain. The highest of these nuclei consists of a group of parasympathetic nerve cells the axones of which are distributed with the oculomotor nerve to supply the sphincter muscle of the pupil and the ciliary muscle. The remaining nuclei contain nerve cells for the supply of the levator palpebrae superioris muscle, the superior, inferior and medial rectus muscles and the inferior oblique muscle.

The axones of all these nerve cells pass ventrally through the midbrain tissue to leave the ventral surface of the midbrain at the inner border of the corresponding cerebral peduncle. In their course through the midbrain they run horizontally through the red nucleus on each side.

Immediately after it leaves the midbrain as a compact bundle of fibres each oculomotor nerve is closely related to three important arteries, the basilar artery lying mesial to it, the posterior cerebral above it and the superior cerebellar below it. The uncus of the hippocampal gyrus of the temporal lobe of the brain lies above the nerve in this part of its course. The bifurcation of the internal carotid artery also is above and slightly antero-lateral to this part of the nerve.

The nerve runs forwards and outwards passing lateral to and below the posterior clinoid process of the sphenoid bone to enter the posterior end of the cavernous sinus. It runs forwards in the upper part of the lateral wall of the

sinus immediately above the trochlear nerve. At the anterior end of its course in the sinus wall the nerve divides into a superior and inferior division which pass through the superior orbital fissure to enter the orbit between the two heads of the lateral rectus muscle. The superior division of the oculomotor nerve ends in branches of supply to the superior rectus and the levator palpebrae superioris muscles. The inferior division supplies the inferior and medial recti and the inferior oblique muscle. This division contains the parasympathetic fibres of the nerves. These are given off as a branch to the ciliary ganglion and they end by synapsis with the nerve cells of this ganglion. The axones of the ganglionic nerve cells leave the ganglion as the short ciliary nerves which enter the back of the eyeball and then run forwards to innervate the ciliary muscle and the sphincter of the pupil.

A person with complete paralysis of an oculomotor nerve will show a drooping of the upper eyelid of the affected eye, and it may be necessary for him to raise the paralysed eyelid with his finger when he wishes to see with this eye. The eyeball will be turned outwards due to the unopposed action of the lateral rectus and superior oblique muscles and he will be unable to turn it inwards, upwards or downwards due to the paralysis of the other three recti. The pupil of the affected eye will be dilated due to the unopposed action of the dilator pupillae. Reflex contraction of the pupil to light or in accommodation will be impossible on account of the paralysis of the sphincter of the pupil and the ciliary muscle.

*Central Connections. Light Reflex.
Argyll Robertson Pupil*

The reflex arc, by which stimulation of the nerve elements of the retina by light causes contraction of the pupil, takes the following course. The axones of the nerve cells in the retina carry the impulses through the optic nerve, optic chiasma and optic tract to the nerve cells of the superior colliculus of the midbrain. These nerve cells have short axones which pass from the superior colliculus to the highest (parasympathetic), nucleus of the oculomotor group. These axones skirt the lateral sides of the aqueduct to reach the oculomotor nucleus. The third neuron in the chain carries the impulses from the parasympathetic cells through the oculomotor nerve and its inferior division to the ciliary ganglion, from which structure the axones of the nerve cells of the ciliary ganglion go to the sphincter of the pupil and the ciliary muscle.

Loss of the reflex contraction of the pupil to light is caused by any lesion interrupting this reflex arc. Destructive or degenerative lesions of the afferent neurone connecting the retina with the superior colliculus do not come within the scope of this article but visual disturbances caused by areas of demyelination in optic nerves, chiasma and tracts frequently occur in cases of disseminated sclerosis.

The pineal gland lies immediately above and between the superior colliculi and, therefore, tumors of this gland will compress or invade the colliculi. In these cases the maximum compression will, naturally, affect the highest nerve cell groups of the oculomotor nuclei and therefore, the patient frequently shows inability to turn the eyeballs upwards, in addition to loss of the light reflex.

The Argyll Robertson pupil, which is

so frequently seen as a manifestation of cerebrospinal syphilis, is a small, (myotic), pupil which has lost its power of reflex contraction to light but which retains its reaction on convergence in accommodation. It appears to be a lesion in which interruption of the light-reflex arc is accompanied by destruction of sympathetic pupillo-dilator fibres.

The nerve-pathway responsible for dilatation of the pupil is believed to begin in sympathetic nerve cells in the posterior part of the hypothalamus. Axones of these cells pass downwards into the upper midbrain, where they are probably situated immediately lateral to the aqueduct. In this part of their course they will, therefore, be passing downwards at right angles to and between the pupillo-constrictor fibres running from the superior colliculus to the oculomotor nucleus. The dilator fibres continue their downward course through the brain-stem and spinal cord to end in the lateral horn of gray matter of the high thoracic spinal cord. The axones of the lateral horn nerve cells carry the pupillo-dilator impulses outwards through the second thoracic spinal nerve to the cervical portion of the sympathetic trunk. The fibres turn upwards in the sympathetic trunk to end by synapsis with nerve cells in the superior cervical sympathetic ganglion. The axones of these cells pass into the sympathetic plexus around the internal carotid artery and reach the orbit in the coats of the ophthalmic branch of this vessel. Leaving the ophthalmic artery the fibres enter the eyeball through the ciliary ganglion and the ciliary nerves to supply the dilator muscle of the pupil.

It will, therefore, be seen that in the whole of this long course the only anatomical position in which the pupillo-dilator pathway and the reflex arc responsible for contraction of the pupil to light

are closely related is in the upper midbrain lateral to the aqueduct, (Merritt and Moore).

Syphilitic endymitis of the aqueduct, with a laterally-spreading gliosis into the subependymal tissues, can be demonstrated microscopically and this is, therefore, probably the cause of the Argyll Robertson pupil.

Some Pathological Lesions of the Oculomotor Nerve.

Haemorrhages into the upper midbrain tissues are caused by head injury and the widely-dilated, fixed pupils seen in cases of severe head trauma are probably caused by these haemorrhages. It is important to note that small amounts of traumatic midbrain haemorrhage are not necessarily fatal. Such patients will show varying amounts of oculomotor paralysis which may be permanent or may slowly recover.

There are numerous important lesions of the oculomotor nerve in its course from the midbrain to its point of entry into the wall of the cavernous sinus. Any lesion compressing or expanding one cerebral hemisphere is apt to cause a downward and inward hernation of the hippocampal gyrus of the corresponding temporal lobe. As the oculomotor nerve lies immediately under the hippocampal gyrus it can be compressed by the herniation sufficiently to cause some of the signs of paralysis of the nerve. This type of compression shows itself mainly, clinically, as a dilatation of the pupil on the side of the lesion. This mechanism is believed to be responsible for the ipsilateral dilatation of the pupil seen in cases of extradural haemorrhage, subdural haemorrhage, intracerebral haemorrhage and tumor or abscess in a cerebral hemisphere. Although the force compressing the oculomotor nerve downwards and in-

wards is probably the hippocampal gyrus, the nerve, in these cases, frequently shows a well-defined kink on the part of its course where it lies immediately below the posterior cerebral artery. The actual mechanism of the paralysis may, therefore, be a strangulation of the stretched nerve by this vessel. The stretched nerve would also be vulnerable at the point where it passes round the base of the posterior clinoid process to enter the cavernous sinus.

Aneurysms of any of the arteries in relation with the oculomotor nerve will be liable to cause oculomotor paralysis. In particular, an aneurysm arising from the posterior wall of the internal carotid artery frequently shows, as part of its clinical picture, complete oculomotor paralysis on the side of the aneurysm. At post mortem the nerve can frequently be seen compressed by or incorporated in the floor of the aneurysmal sac.

Paralysis of the oculomotor nerve is seen in cases of septic thrombosis of the cavernous sinus but, typically, the other adjacent nerves are similarly affected in this disease. The patient will, therefore, show complete immobility of the eyeball, (ophthalmoplegia), due to the concurrent paralysis of the trochlear and abducens nerves and will have disturbance of sensation in the distribution of the ophthalmic and maxillary divisions of the trigeminal nerve.

A meningioma growing at the inner end of the sphenoidal ridge may cause compression and paralysis of both divisions of the oculomotor nerve as they pass through the superior orbital fissure.

Finally, in the orbital cavity the nerve may be paralysed by retroocular infections or tumors. Here again, as in lesions of the cavernous sinus, other nerves are liable to be involved. One case has been seen in which the superior division of the

oculomotor nerve was damaged selectively by the spread laterally of a carcinoma arising in an anterior ethmoidal sinus.

Reference: Merritt, H. H. and Moore,

M. The Argyll Robertson Pupil: An anatomico-physiological explanation of the phenomenon, with a survey of its occurrence in Neurosyphilis. Archives of Neurology and Psychiatry. Page 357, Volume 30, (August), 1933.

INFECTIONS IN HANDS

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Infection in hands can be avoided. Therefore, the blame for the long and costly illness and the permanent disability which follows must be laid at someone's door. Sometimes it is the patient who is to blame and sometimes it is the doctor; but always there is someone.

Infection never occurs spontaneously. It arises because bacteria gain entrance to tissue through some portal. Over 100 years ago Spallanzani following in the footsteps of Leeuwenhoek, proved that pus which appeared in wounds was not generated spontaneously but was the result of the introduction of living organisms into the wound. Lister argued that if this were true, he would attack those organisms and prevent their entry so he built the carbolic spray. Today, we sometimes forget the teaching of these great men, although their statements are just as true and just as useful as when first made. If bacteria could be prevented from establishing themselves, infected hands would not occur.

Furthermore, the portal of entry is usually so obvious that it can easily be safeguarded. Bacteria enter through breaks in the epithelium. Blood borne infection in hands is practically unknown. All infections were, at their earliest stage, simply wounds. Therefore, an infected hand means a neglected hand. Someone had a chance to cleanse the wound thoroughly and so ensure primary healing.

From the patient's view point, it is easy to understand carelessness. Most small wounds do not become infected, even though infections do begin in wounds. Ninety-nine times out a hundred no serious consequences follow small injuries.

Workers must be taught, and are being taught, that the one time when infection does lodge is so costly and so serious, both to the individual and to organized industry, that care must be taken to avoid it.

What can the workman do? Most large plants to-day come under the Workmen's Compensation Board, and have set up First Aid posts with a First Aid man in charge who has had some training. The men are instructed to report promptly all injuries, large or small. This gives the First Aid man a chance to cleanse the wound and apply a dressing.

If there is no such station available, the injured man might well follow the simple routine employed by some surgeons in the event of accidental wounding of the finger by a needle while operating on an infected case. At the earliest possible moment, the surgeon scrubs the wound vigorously for several minutes with soap and water and a small scrub brush such as is used before operation. He then applies an antiseptic, perhaps iodine, although tincture of iodine is rapidly passing from favour because of its harm to raw tissue. It sounds simple and yet it must be efficacious because a good hand is important to a surgeon—just as important as it is to a machine worker. Where workers are grouped together, instruction may be given in their responsibility in caring for small wounds early.

But the doctor also has a part in the picture for sometimes the patient does present himself promptly after injury, and then the responsibility for cleansing the wound thoroughly and obtaining primary union rest solely with the doctor.

GENERAL PRINCIPLES

By way of general remarks, applicable to all cases, one or two first principles may be laid down, before going on to details of specific conditions.

1. THOROUGH OPERATION:

If operation is undertaken at all, it must be performed thoroughly. More harm is done by inadequate stabs in an infected hand than would be done by leaving it alone altogether. We have seen a patient with a "frozen hand" resembling a small ham, who had had 20 incisions, none of them over $\frac{1}{2}$ inch long. The hand was a total loss from the point of view of function.

Incision should be made directly over the place where pus is most certain to be found, and then should follow wherever the pus leads. Counter openings are made at appropriate places to ensure free and adequate drainage. There is no need to fuss over special complicated incisions placed here or there according to blind rules. Remember the basic principles and apply them.

A little knowledge is a dangerous thing, in hands as elsewhere. A knowledge of anatomy may result in more harm than good. Surgeons have been known to demonstrate and save the arterial arches at the expense of good drainage. The whole hand became fibrosed and useless. Once infection has lodged it is a "sine qua non" that the infection must be overcome, and that as promptly as possible.

Prolonged infection produces fibrosis, widespread throughout the whole hand. The correct knowledge of anatomy suggests that the surgeon should sacrifice anything which is necessary to secure free drainage at the first operation, making exception only of nerves and tendons.

Motor nerves must not be cut. Reference is particularly to the motor branch

of median running to thenar eminence as well as ulnar branches which are equally important but less exposed. The statement that tendons must not be cut nor sheaths opened, is so obvious as barely to require mention. Both of these "thou shalt not" are easily respected by the usual incisions running in direction of important structures.

2. TOURNIQUET:

Operations on hands should always be performed under tourniquet. A clean bloodless field permits accurate anatomical dissection and gentle accomplishment of the task. Operations will be more thorough and less traumatic.

In cases limited to the distal half of the finger, an elastic band placed once around the base of finger and held with forcep is excellent. A regular pneumatic tourniquet above elbow will be necessary for all operations on body of hand or wrist. It should be pumped up to 256 mm mercury after the arm has been elevated for a few minutes to allow the blood to run out.

3. ANAESTHETIC:

Nearly all surgical procedures on hands should be carried out under anaesthetic. To "lance it in the office" too often means an inadequate stab as the patient jerks his hand away, like shooting at a moving target, and few of us are good enough for that. Infections are too painful to permit proper opening. The patient's failure to return does not mean that he is cured—he has gone to some one else.

a. General Anaesthetic: Often general anaesthesia is the only satisfactory one in spite of all the fuss which it necessitates for a mere "sore finger." There is no alternative for opening tendon sheaths or palmar spaces.

b. Nerve Block: For lesions limited to distal phalanx such as felon or paronychia,

an alternative to general anaesthesia is offered in nerve block.

Injection of 1 cc. of 2% novocain around the digital nerve at each side of the base of the finger will give excellent anaesthesia for a short time. Skin must be carefully prepared because a clean surgical procedure is to be carried out fairly close to an infected area at the end of finger. Ten minutes must elapse before anaesthesia is established.

c. Freezing: Ethyl Chloride spray to freeze the skin is not good. It adds damage to already devitalized tissue. Accurate drainage is impossible. At best one must force the knife suddenly through a hard frozen crust. Furthermore, patients reports that the freezing and thawing cause almost as much pain as to open the area without any anaesthetic.

d. Local Infiltration: Occasionally pus lies deep enough that the covering skin is relatively normal. An "intradermal" weal may be raised with 2% novocain which gives instant anaesthesia of very short duration. The weal should be about $\frac{1}{4}$ " wide, and knife cut can be made directly in the course of the weal. Infiltration of infected tissues is not good for fear of spreading cellulitis.

With the general principles well in mind, we may now discuss briefly their application to the more common type infections.

4. SULPHONAMIDES AND PENICILLIN

Many hand infections, if caught early during the stage when they are cellulitis and not suppuration, can be aborted by the decisive exhibition of sulphanilamide or sulphathiazole. Intravenous administration is best but the drug can be given by mouth. The usual rules are followed. Blood level must be raised to effective level and complications must be forestalled.

Other cases, further advanced, may be held in check after operation. The surrounding cellulitis and lymphangitis will often recede more surely, if sulphonamides are administered systemically than if they are withheld.

A—CELLULITIS

The commonest and at the same time the most dangerous infection is caused by lodging of bacteria directly in the loose cellular tissues. Cellulitis ranges all the way from the thousands of sore fingers and small infections to the severe spreading streptococcal cellulitis with red streaks running up the arm. It is this latter with its lymphangitis and lymphadenitis which is dangerous and which is responsible for the occasional rapidly progressing and fatal case.

In all cellulitis, treatment must be extremely conservative. Rest in bed, hot wet dressings, electric cradle, fluids, and sedative, will enable patient to overcome most. To operate may satisfy the frantic relatives but will only facilitate the spread of infection and make patient worse. In fact, as Koch so graphically states: "In such cases if conservative measures do not bring about an arrest of the infectious process, one may be certain that surgical intervention will only hasten the inevitable and fatal outcome."

Localization and pus formation occurs only late in cellulitis and operation is indicated only when incontrovertible signs of pus are present. One is no longer dealing with cellulitis but with abscess, so the indications are different.

The sulphonamides are most useful in cellulitis, especially in streptococcal infections, and should be used. Occasionally results are dramatic. Improvement is evident in 24 hours if any is to be obtained.

B—TENDON SHEATH INFECTION

Acute inflammation with pus formation in flexor tendon sheath is one of the most crippling types of infection that can befall a hand, for if the tendons are damaged the whole function of the hands, which is to grasp, is destroyed.

The diagnosis may be made by observing the four cardinal signs of acute tenosynovitis.

1. History of injury: Bacteria enter only through broken skin. A small puncture wound, a needle prick, a tack carries infection directly into sheath if the

an inflamed tendon in an inflamed sheath causes pain just as respiration causes pain in pleurisy. Demonstrated by gently straightening the semi-flexed finger.

Immediate operation should follow the diagnosis of tenosynovitis in an effort to save the life of the tendon. Once death of tendon has occurred, good surgery can bring about subsidence of acute infection by drainage but cannot restore function to tendon.

Operation (see figure 1) must accomplish several details.

1. Drain sheath from end to end since

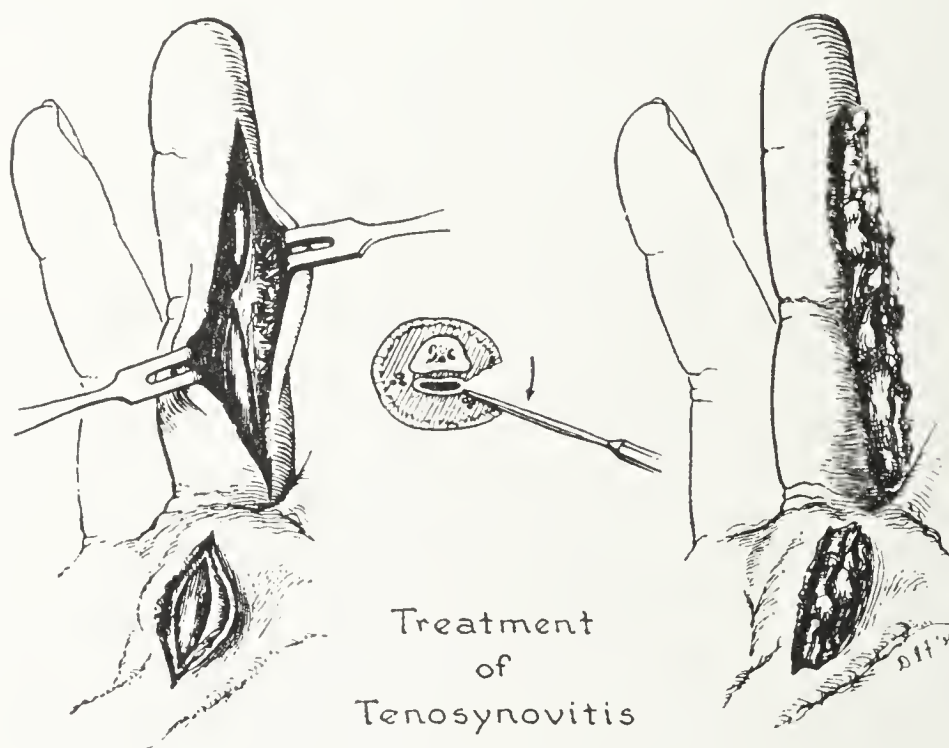


Figure 1.

injury be over flexor creases where fat pad is lacking.

2. Semi Flexion: Inflammatory exudate increases pain because of increased tension. Semiflexion gives the most slack space and the most comfort.

3. Tender over Sheath: Inflammation quickly spreads to whole sheath. Pressure, therefore, will elicit tenderness which outlines the anatomical position of the sheath throughout its whole length, no matter where the original entry may have been. Thus is explained the tenderness in the distal part of palm.

4. Tender on Movement: Sliding of

it is infected from end to end. Nothing less is adequate.

2. Preserve digital nerves and vessels.

3. Prevent tendon from "bow stringing" out of its bed by leaving tiny bridge to hold it down.

4. Maintain drainage by loose packing.

We have had some very encouraging results following the use of Penicillin in tenosynovitis. There is reason to suggest that Penicillin injected directly into an infected sheath may overcome the infection without operation and may give a better result in less time than any treatment heretofore offered. Ten thousand

units in 1 cc of solution is injected every 12 hours for 3 days.

If the patient arrives late and the tendon is already dead, it will, of course, not be repaired.

Penicillin also is writing a new chapter into the care of infections in hands as elsewhere. It has two great advantages over sulphonamides as it seems to be non-toxic, and it continues its anti-bacterial action in the presence of pus. Penicillin cannot be given by mouth; it must be given intravenously in doses of 125,000 units, over a period of 24 hours, for 1 to 5 days: or intra-muscularly in doses of 15,000 to 20,000 every 3 hours day and night until infection comes under control,

dressing on an infected patient produce a small injury in distal phalanx.

2. Distal Phalanx: In this case the process is limited to distal phalanx, the rest of the finger being normal.

3. Tender: Slight pressure over pulp of distal phalanx produces increase of the all ready severe pain. The tension which develops in this distal closed space is responsible for increased pain and tenderness.

4. Swelling: By comparing with the corresponding finger in the other hand the distal phalanx will be seen slightly swollen and definitely tense.

Operation (see figure 2) is carried out at once for the reasons stated above.

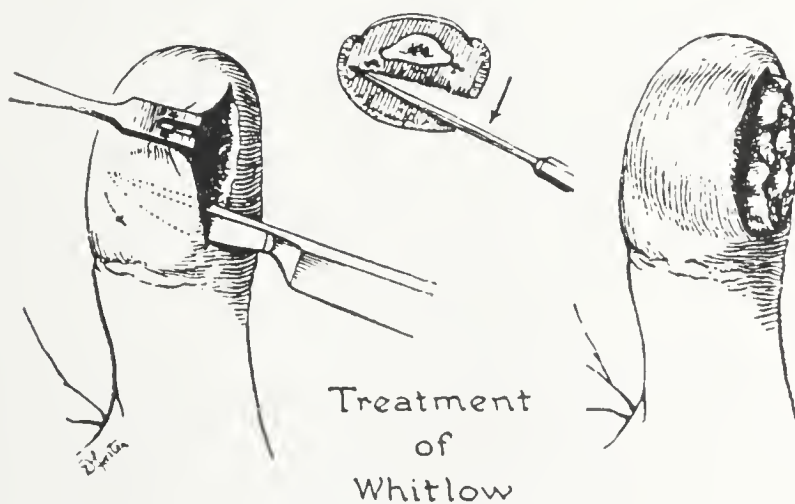


Figure 2.

which it usually does very promptly, or it may be injected locally into the inflamed tissues in doses of about 15,000 units as needed, usually only 1 dose per day for 1 to 2 days in small moderate infections.

C—FELON

Acute inflammation in the anterior pulp space of the distal phalanx also demands immediate operation to avoid needless acute suffering for the patient and to avoid death of bone lying in a bed of pus.

Again the evidences which permit accurate diagnosis are small but clear.

1. History of Injury: A rose thorn, a needle, a "safety pin" used to fasten a

Again it must be done thoroughly or not at all and must accomplish the following:

1. Drain distal closed space from end to end and from side to side. Cut all the trabeculae across to ensure free flow.

2. Avoid stabbing bone with point of scalpel which has traversed infected field.

3. Avoid nicking end of tendon sheath for fear of adding tenosynovitis.

4. Maintain free flow by deep, loose packing.

D—PARONYCHIA

Infection which finds its way into the soft tissue around base of nail is in a particularly bad place for adequate drainage to occur naturally. The space so involved

extends from side to side, both above and below base of nail so that operation must be so designed to remove nail as well as open surface infection.

The typical picture is well known and is recognized by the following points:

1. Distal phalanx: Paronychia, like felon, is limited strictly to distal phalanx. Rest of finger is normal and constitutional reaction is slight.

2. Puffy. The chief characteristic of

infection in least possible time. The details are shown in Figure 3 and are designed to accomplish the following steps:

1. Lift flap to drain space above base of nail.

2. Remove half of nail to permit free drainage of space under nail.

3. Prevent flap from falling back and obstructing drainage.

The space devoted to clinical picture and description of operation is deliberately

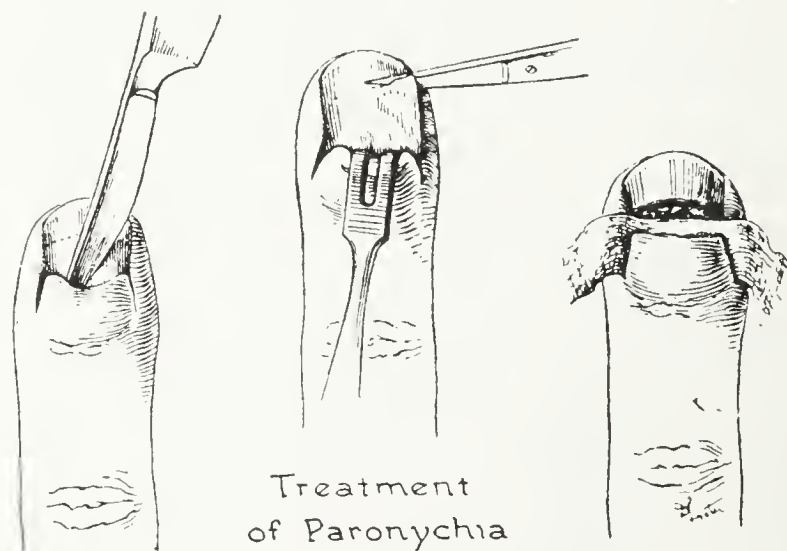


Figure 3.

lesion is the swollen, puffy red area just above the base of nail, extending across from side to side.

3. Nail floating: In late neglected cases, proximal part of nail is actually free from its bed and appears to be "floating" on a bed of pus, which can be seen through the nail.

Operation, if prompt and thorough, will give patient comfort and get rid of in-

small because general principles are always more important and if clearly understood, can readily be applied to any specific problem. The drawings show clearly the steps of operation in each case.

1. Bunnell, S.: *Surgery of the Hand*, J. B. Lippincott, Montreal.

2. Couch, J. H.: *Surgery of the Hand*, University of Toronto Press, 2nd ed. 1944, pp, 103, 116, 130.

BLAST INJURIES OF THE THORAX AND ABDOMEN— CLINICAL ASPECT

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Part II

Blast Injuries of the Thorax and the Abdomen—Clinical Aspects.

The aetiology and the pathology of blast injuries of the thorax and the abdomen have been covered in the previous section of this paper. It is proposed to deal now with the clinical aspects of the subject. These may be divided into the following four parts:

1. The clinical picture, including radiological findings.
2. Diagnosis.
3. Prognosis.
4. Treatment, including prevention.

1. *The Clinical Picture*

(a) *Air blast injuries.*

In individuals exposed to an explosion in the open air, for the first hour or two, shock, with pallor, cyanosis, and restlessness, may constitute the whole picture. Usually, there is no external evidence of trauma. Then the patient becomes dyspnoeic and complains of pain in the chest and, in some cases, pains in the abdomen. The temperature is subnormal; the pulse and the respiratory rate are above normal. The patient develops a short, grunting cough, which is usually unproductive at first, but later produces blood-stained sputum. Sometimes, however, there is haemoptysis within the first hour or two; and haemoptysis may persist for as long as two or three months.

The chest is held three-quarters expanded and there is bulging, particularly of its lower portion. Respiratory movements are diminished, but equal on the

two sides, and the excursion of the diaphragm is reduced. There is no change in tactile fremitus. The percussion note is normal in the early stage, but later there is often dullness at one lung base. The breath sounds are reduced and later may become tubular at one lung base. There are coarse rales all over the chest in the severe cases and these remain to the end in the fatal cases. The less severe cases have fewer, or no, rales. Occasionally, rhonchi occur. Pleural rub is not mentioned in any of the reports.

Later, there often occurs a sharp rise in temperature, and the clinical picture of lobar pneumonia of one lung base presents itself. This may appear as early as from twelve to twenty-four hours after the injury or may not appear for several days.

Death may occur at once, in which case, there would appear to be interference with some vital centre. Of those who reach medical aid, some die within a few hours, some go progressively downhill and die in a few days' time, while some make a complete recovery.

Some of the more prominent features will now be considered in greater detail. *Shock* is present in all cases and its severity varies with the severity of the injury. In severely injured patients, the shock is profound. *Restlessness*, also, is proportional to the seriousness of the condition.

The constancy of *dyspnoea* as a symptom is not universally agreed upon. Certain observers (1, 2, 3) state that it is present in *all* cases, and that in the fatal cases it persists until death super-

venes, whereas the cases that recover lose their dyspnoea in twenty-four to forty-eight hours. Another group (4) reports that, of twenty-seven cases, only one gave any history of dyspnoea. As they did not see their patients, however, until a week or more after the injury, their histories may not be thoroughly reliable. Two factors are suggested to operate in the production of dyspnoea, viz., (a) the thoracic pain, and (b) the fact that the lower portion of the chest is held in a position of inspiration.

There is obvious *cyanosis* in the fatal cases, and it persists until they die. The cases that go on to recovery have less marked cyanosis that disappears after about twenty-four hours.

All the reports that the writer has read, except one (4), give *chest pain* as part of the typical picture. O'Reilly and Gloyne (1), dealing with this subject at some length, report that there are two distinct types of pain. The first is a deep, central pain which was present in all of their fatal cases but was *not* a prominent complaint of the less serious ones and disappeared within a few days. The cause of this pain has not been determined, although it has been suggested that it may be due to haemorrhage into the mediastinum.

The other type of thoracic pain occurred laterally and was aggravated by deep breathing, so that it interfered with respiration. In the cases that recovered, it persisted longer than the deep pain, since it did not disappear for at least a week. The theory is propounded that this pain may have been caused by contusion of the intercostal muscles. This is supported by the fact that in the fatal cases extrapleural haemorrhages were constantly found at autopsy in the intercostal spaces.

Abdominal pain is not present in all

cases, but in some has been so severe as to induce the surgeon to perform a laparotomy. O'Reilly reports (1) such a case, in which the only finding was a few small subserous haemorrhages in the intestinal wall. He attributes the pain and rigidity to inilation of the intercostal nerves by the haemorrhages in the intercostal spaces (already alluded to). Further evidence in favour of this theory is Zuckerman's finding in animals that haemorrhages in the intercostal spaces are continuous with haemorrhages inside the sheaths of the intercostal nerves.

Haemoptysis may occur within from one to two hours after the injury or after a day or two; but this symptom is neither prominent nor necessary for the diagnosis of blast injury.

Cough may not appear until after twenty-four hours. It is a short, grunting cough and is at first unproductive. Later, dark blood may be coughed up. In uncomplicated cases the cough and the sputum disappear within ten days, while in cases in which complications occur, they may persist longer than this.

The development of the *picture* typical of a *lobar pneumonia*, O'Reilly explains on the basis that the alveoli have filled with red blood cells, so that the picture is that of red hepatization. That this is the explanation rather than that there is a true pneumonia would seem to be confirmed by the fact that sulphonamides have proven ineffective in preventing the development of this state.

The *radiological* appearance of the lungs is characteristic in cases of blast injury. It consists of areas of increased density that give a heavily mottled appearance over large areas of the lung. This is due, of course, to the interstitial and alveolar haemorrhages throughout the lungs. When extensive consolidation occurs, the x-ray shows a large, dense area to cor-

respond. In the non-fatal cases, the picture clears as the physical signs disappear.

There is a second feature of the x-ray that is characteristic. The ribs overlying the involved portion of lung are crowded together posteriorly and widely separated anteriorly, since this part of the chest is hyper-expanded.

In considering a plate in a suspected case of blast injury, it is important to realize that the picture may be altered by such things as haemothorax, haemopneumothorax, or collapse of the alveoli following the inhalation of dust or other foreign bodies. There may, in addition, be present such lesions as fractures of the ribs or of the sternum.

Among the less common injuries that may be caused by explosions in the open air are included haemothorax, pneumothorax, tearing of the intestine (3), ruptured eardrums, haemorrhage into either the anterior or the posterior chamber of the eye, and chemosis.

(b) Underwater blast injuries.

The usual picture is as follows: When the explosion occurs, the man, swimming in the water, feels as though he had been struck a heavy blow on the abdomen. In less than an hour, usually in only a few minutes, he has crampy abdominal pain which may be either mild or severe. He has repeated, forcible bowel movements, usually beginning within half an hour and lasting for several hours. Later he may have bloody diarrhea. Most of the patients vomit and the vomiting may continue for several days, with blood and bile in the vomitus. There is never haematemesis or any other sign of urinary tract involvement.

Unconsciousness is not typical of the condition, but they are shocked and in

some cases periods of stupor occur as they float about in the sea.

Most of these cases feel, at the time of the explosion, as though the chest also had been compressed. They tend to have haemoptysis for the first twelve to twenty-four hours.

Bilateral testicular pain is usually complained of, according to some observers, while others say that it is seldom encountered.

On physical examination, they are found to be shocked (as already mentioned) and may be dehydrated. There is no external sign of injury. The abdominal signs vary from moderate tenderness to extreme tenderness with board-like rigidity and distention. In the severe cases the abdomen is tympanitic and no peristaltic sounds can be heard on auscultation.

The chest signs are the same as with explosion on land but less marked. There are decreased air entry, a reduction in the excursion of the diaphragm in severe cases, and slight to moderate dullness over the lung bases. Later there are rales and rhonchi.

Usually the temperature is about 102 F by the time they are admitted, and the white cell count varies from 11,000 to 30,000. In severe cases, there may be an elevated sedimentation rate.

Breden and his associates (5) divide their cases into three groups. The first consists of those patients who have obvious abdominal injuries but recover completely without operation. The prominent features in these cases are shock, haematemeses, melaena, and abdominal pain, tenderness, and rigidity. The pain, tenderness, and rigidity are caused by the peritoneal reaction to the serosal injuries. The rigidity usually disappears within two or three days.

The second group consists of those

patients in whom severe injuries, such as intestinal lacerations, are found at operation. Such a patient gives increasing evidence of peritonitis.

The third group comprises those patients who have late complications, such as abscess formation. Cases are recorded of pelvic abscess and of subphrenic abscess which later went on to a right-sided empyema. The point worthy of note in these cases is that the abscess developed *insidiously*. In none of these cases were the signs such as to indicate the perforation of a viscus. It is suggested that a perforation may *not* have occurred, but that bruising may have allowed the permeation of organisms through the wall of the viscus.

The testicular pain, which is an inconstant complaint, is probably due to haemorrhages deep to the tunica albuginea, as such haemorrhages have been found in the testes of animals that have been exposed to underwater explosions (6).

The seriousness of the picture depends on two factors, viz., the distance of the individual from the site of the explosion and the position of the individual in the water. The former of these two factors has been dealt with in the first section of this paper. As regards the position of the individual, it has been found that men who are facing *away from* the explosion are less seriously injured than those facing *towards* it. This is well illustrated by a case (11) of two men who are swimming side by side, one on his back, the other on his abdomen, when a depth charge exploded. The man swimming on his abdomen was killed at once, the other was discharged from the hospital at the end of two weeks, the explanation apparently being that the posterior abdominal wall acts as a better buffer than does the anterior wall.

The radiological picture of both the chest and the abdomen may show abnormalities. Gates (7) in a series of thirty-five patients, found abnormalities of the lung in thirty. These patients show areas of increased density, usually in one or both lower lobes. These areas take two forms. Firstly, there are linear areas of increased density in the costo-phrenic angle and just above the lateral portion of the diaphragm. These areas vary in size from 3 cms x $\frac{1}{2}$ cm. to 5 cms x 1 cm. and have fuzzy, ill-defined margins. Secondly, and less commonly, there may be a wedge-shaped area of increased density in the region of the costo-phrenic sinus, with the apex of the wedge pointing medially and superiorly. The maximum dimension of such an area is about 6 cms. Moreover, in thirty percent of cases, the x-ray gives evidence either of pleural thickening or of a film of fluid in the costo-phrenic angle. These abnormalities are thought to appear in the *basal* portion of the lung because the remainder of the chest is protected by a life-jacket.

Flat plates of the abdomen show gaseous distention of the small intestine and gas in the colon. In only two cases out of thirty-five was there gas in the peritoneal cavity. Some cases showed fluid between loops of bowel; and in two cases there were small gas bubbles, apparently in tissues outside the intestine.

A barium meal was given to a series of five cases that recovered, but in only one of these was any abnormality detected. This consisted of irregularity of the mucosal markings, due probably to submucosal oedema and haemorrhage. Another worker (8), using barium, discovered a case of diaphragmatic hernia, in which the colon and the stomach were involved.

II Diagnosis

In the matter of diagnosis, as with the clinical picture, air blast injuries will be considered first, and then those caused by underwater explosions will be dealt with. The diagnosis of the former is based upon history, physical examination, and radiological examination of the chest.

The important points in the *history* are the explosion, the thoracic pain, and the dyspnoea. On *physical examination*, the points that suggest the possibility of blast injury to the lung are shock (out of proportion to the degree of injury), restlessness, cyanosis, reduced respiratory movements with bulging of the lower portion of the chest, diminished breath sounds, and the presence of rales (and sometimes rhonchi). Haemoptysis is an inconstant finding, but, when present, is suggestive. Cough, also, must be regarded with suspicion. An important point is the absence, in the majority of cases, of any sign of external injury. It may be forgotten, however, and for that reason is worth stressing, that the presence of external injuries of the chest wall, such as contusions or crushing injuries, does *not* mean that blast injury of the lung may not have occurred as well.

Radiological examination is helpful to confirm a provisional diagnosis based upon history and physical findings. Of even greater value, however, is its use in detecting cases that give no clinical indication of their presence. Because chest complications sometimes develop with no warning symptoms and because inhalation anaesthetics are contra-indicated in cases of blast injury to the lung, routine radiological examination of the chest is advisable for those patients near whom explosions have occurred.

In the *differential diagnosis* of blast injury of the lung, the following conditions must be considered:

1. *Haemothorax*. In this case there is dullness on percussion, which is not the case in blast injuries in the early stage.

2. *Pneumothorax*. The percussion note is tympanitic.

Both of these conditions may occur in blast cases due to tearing of the visceral pleura.

3. *Fractures* of the ribs or of the sternum may confuse the clinical picture.

4. *Contusions* or *crushing injuries* of the chest wall may occur either separately or in conjunction with blast injury of the lung.

5. There is a fifth condition that so far has not had to be considered, but, as long as the war lasts, is a possibility that must be included in the differential diagnosis. That is *poisoning by gas*. The history will help to distinguish poisoning from blast injury, and the symptoms of gas poisoning come on later than do those of blast injury. Moreover, pain and haemoptysis are unlikely in cases of poisoning.

In the *diagnosis of immersion blast injuries*, the *history* is of outstanding importance, since a story of a depth charge exploding while the patient was in the water and causing a feeling of compression of the abdomen at once suggests the likelihood of intra-abdominal injuries.

The *physical examination* is the second step. Its value is in assessing the seriousness of the injury and in determining whether the patient is progressing or whether such complications as peritonitis or abscess formation are occurring. The physical findings that characterize intra-abdominal blast injuries are shock, haematemesis, melaena, and fever.

The chief value of radiology is in detecting gross perforations of the intestine by the presence of air in the peritoneal cavity.

III PROGNOSIS

(a) *Lung injuries*

There are a number of points upon which one may base one's prognosis in cases of blast injury to the lungs. The severity of the shock and the degree of restlessness give the earliest indication of the seriousness of the patient's condition, since these are proportional to the degree of lung damage. As, in fatal cases, cyanosis and dyspnoea persist until death supervenes, their disappearance brightens the outlook considerably. In cases that are going to recover, cyanosis usually vanishes by the end of twenty-four hours. Rales also have a bearing upon the prognosis, since in fatal cases they are more numerous and do not disappear. Moreover, in non-fatal cases, the deep, central chest pain disappears in a few days. Finally, any pre-existing lung disease naturally decreases the chance of recovery. This factor is not likely to come into the picture among military personnel, who are presumably healthy, but must be considered in forming a prognosis for civilian casualties.

(b) *Immersion blast injuries*

The mortality rate among those cases that reach medical care alive seems to lie between about 10 and 25%, varying with different reports (9, 10, 11). The distance of the individual from the explosion, his position in the water at the time of the explosion, and the degree of protection afforded by his life-jacket are the three major factors that determine his chance of survival.

From the point of view of pathology, the cases may be divided into those *without* any perforated viscus—for whom prognosis is good—and those *with* perforation for whom the prognosis is much poorer. Between these two groups are those who do not *appear* seriously ill and

yet have complications develop insidiously, probably from permeation of the intestinal wall by bacteria.

IV TREATMENT

(a) The treatment of the pulmonary injuries is entirely medical, except in the rare case where artificial pneumothorax is induced. The first point is the *recognition* of the condition. This may seem too obvious to need stating, yet, as has been said earlier, some cases will be missed unless they are examined radiologically.

The patient should be put to bed; and to combat shock, restlessness, and pain, heat should be applied and either morphine or heroin administered. Williams (3) favours heroin, as not having the depressant effect of morphine. He advocates doses of $\frac{1}{8}$ grain, repeated as necessary.

Blood transfusions ought not to be given unless there has been a loss of blood (1, 3). As regards the administration of plasma, some workers (1) favour its use to combat shock, while others oppose it on the ground that it causes further flooding of the alveoli at a time when the respiratory system is already sufficiently embarrassed:

For dyspnoea and cyanosis, oxygen should be administered, and most men recommend the use of a mask. Venesection (1) has been found to give relief, but must not be employed as long as the patient is in a state of shock.

The administration of sulphonamides has been tried as a prophylactic measure against pneumonia, but the results have been so disappointing that the use of these drugs would not seem to be justified. Williams censures the use of sulphanilamide or sulphapyridine during the first twenty-four hours on the grounds that they have some depressant effect and

induce vomiting. The use of these drugs when the picture of pneumonia *does* occur is useful in shortening its duration.

The subject of *anaesthesia* in cases of blast injury of the lungs is an important one, since conditions calling for surgery may be present. The use of inhalation anaesthetics is definitely contra-indicated, unless the need for their use is urgent. If a local anaesthetic is not adequate, Williams (3) favours nitrous oxide and oxygen, possibly preceded by a minimum dose of evipan or pentothal. He decries the use of barbiturates alone, because of their depressant effect. Hamilton Bailey (2), on the other hand, advocates intravenous anaesthesia, if local anaesthesia does not suffice. Ether and chloroform should never be used; and spinal anaesthesia is contra-indicated in the presence of shock and lowered blood-pressure. The possibility that an anaesthetic may be necessary is one very important reason for recognizing these injuries early, and for this reason routine radiological examination is advocated, even when there are no clinical signs.

In cases in which there is a haemo-pneumothorax from tearing of the visceral pleura, Kretzschmar (12) believes that air already in the pleural cavity should be augmented by an artificial pneumothorax. The purpose of this is to stop the haemorrhage by collapsing the lung.

(b) The treatment of *abdominal blast injuries* may be divided into non-surgical and surgical. As yet, however, there is a great deal of controversy as to when recourse should be had to surgery. Certain groups (8, 9, 13) believe that the patient should not be subjected to operation, unless there are definite indications for it, as they say that most patients will recover without surgical intervention if they and their gastro-intestinal tracts are kept at rest. Even these groups, however,

are not in accord as to what constitutes an indication for surgery. McMullin (9) says that *recent* perforation, gangrene of a segment of bowel, or abscess formation call for surgery, but that a perforation of several days' standing with peritonitis from which the patient is close to death should *not* be operated upon. Greaves and his associates (13), on the other hand, feel that peritonitis *does* call for surgery. Auster and Willard (8) advocate surgery in cases of gross perforation, whereas small perforations and the peritoneal reactions resulting from haemorrhage into the intestinal wall they would treat conservatively.

Other groups (10, 14) favour an early exploratory operation. Webster (11) says that the decision should be made within twelve hours and that, if any doubt exists as to the condition of the bowel, operation should be performed. Jacobs (10) favours an exploratory operation with closure of any perforations, rinsing of the abdominal cavity, and intra-abdominal sulphonamide therapy if this can be carried out within two hours of the injury, but feels that, when peritonitis has established itself, operation merely reduces the patient's chance of surviving.

A question of importance in settling on the time of operation is whether all perforations occur at the time of the explosion, or whether they may occur later because of necrosis. Friedell and Ecklund (15), on the basis of animal experiments, believe that they occur at the time of the explosion or not at all. Pinnock and Wood (14), on the other hand, from clinical observation feel that bruised areas of bowel may perforate later. In spite of this, they advocate early operation to detect any perforations caused by the explosion; and if perforations occur later, they would operate a second time.

From what has been said, it should be

clear that the problem of when to resort to surgery is far from settled. The first object in the *medical* treatment, as in the treatment of blast injuries of the lung, is to combat shock, restlessness, and pain. For the latter two, morphine should be given; for shock, plasma intravenously. Nothing should be given by mouth; and, to maintain the proper level of fluids and electrolytes and to provide nourishment, intravenous saline and glucose should be given. To reduce the pressure in the distended intestine, continuous suction should be carried out by a Miller-Abbott tube. If an appreciable amount of blood is lost, the patient should be transfused. These measures will take care, also, of the injuries of the lung bases which are usually associated with the abdominal injuries.

With regard to the prevention of blast injuries, several investigators (13, 15, 16, 17) have carried out experiments in which animals were exposed to blast waves both in water and in the air, with and without life-jacket. Foam rubber and kapok were both found to give satisfactory protection, provided they were not allowed to become water-logged. Animals immersed in water and subjected to two and one half times the lethal charge showed only minimal lesions when protected by dry kapok (16).

In the case of human beings, greater protection would be afforded by life-jackets that cover not only the thorax but also the abdomen, front and back. The life-jacket, to give full protection, should extend down to the level of the great trochanters. Moreover, naval personnel should be instructed to swim on the back rather than on the abdomen and, when they have climbed onto a raft, to sit up or stand up rather than lie down if depth explosions are expected. If they are holding onto a raft and cannot climb onto it,

they should hold themselves as high out of the water as possible in order to protect the chest and the abdomen.

Those who are exposed to the action of explosives on land should be instructed to take shelter if possible and, if none is available, to lie flat in a ditch or a hole or even open ground. It is better to lie prone than supine, since the back can better withstand the force of the explosion than can the anterior surface of the body.

Summary

An attempt has been made to outline the typical clinical pictures of blast injuries of the thorax and of the abdomen and to indicate the important points in diagnosing them and in forming a prognosis. The medical treatment has been discussed and a brief sketch has been given of the controversy that exists with regard to the place of surgery in the treatment of the abdominal injuries.

BIBLIOGRAPHY

1. J. N. O'Reilly and S. R. Gloyne—*Lancet* 2, 1941, 423.
2. H. Bailey—*Surgery of Modern Warfare*—1942, Vol. 1, P. 29.
3. E. R. P. Williams—*Brit. J. Surg.* 30, 38, 1942.
4. D. M. Dean, A. R. Thomas, R. S. Allison—*Lancet* 2, 1940, 224.
5. N. P. Breden, A. L. d'Abreu, and D. P. King—*Brit. Med. J.* 1942, 1, 144.
6. G. R. Cameron, R. N. D. Short, C. P. G. Wakely—*Brit. J. Surg.* 31, 121, 51.
7. R. Gates—*U.S. Naval Medical Bulletin*—41, 1, 12-1943.
8. L. S. Auster and J. H. Willard—*J.A.M.A.* 121, 995, 1943.
9. J. J. A. McMullin—*U.S. Naval Medical Bulletin*—41, 1, 1-1943.
10. R. G. Jacobs—*U.S. Naval Medical Bulletin*—41, 3, 816-1943.
11. D. R. Webster, A. S. Ross, E. I. Alford—*C.M.A.J.*—49, 14, 1-1493.
12. C. H. Kretzschmar—*Lancet* 1, 1940, 832.
13. S. Zuckerman—*Lancet* 2, 1940, 219.

14. D. D. Pinnock and P. Wood—Brit. Med. J. 1943, 1, 537.
15. M. T. Friedell and A. M. Ecklund—U.S. Naval Medical Bulletin, 41, 2, 353-1943.
16. Greaves, Draeger, Brines, Shaver, and Corey—U.S. Naval Medical Bulletin—41, 2, 339-1943.
17. J. V. Wilson and R. E. Tunbridge—Lancet 244, 257.
18. J. Palm and J. J. Uldall—U.S. Naval Medical Bulletin 41, 1, 3.
19. H. L. Pugh—U.S. Naval Bulletin 41, 1, 9.
20. A. M. Ecklund—U.S. Naval Medical Bulletin 41, 1, 19.
21. H. Hamlin—U.S. Naval Medical Bulletin 41, 1, 26.
22. M. T. Friedell and R. Burke—U.S. Naval Medical Bulletin 41, 2, 363.
23. G. Hadfield, R. H. A. Swain, J. M. Ross, J. M. Drury-White—Lancet 2, 1940, 478.
24. P. B. Ascroft—Lancet 1, 1943, 234.
25. Lancet 244, 385.
26. J. D. King and G. M. Curtis—Surg., Gyn., and Obst., 74, 53, 1942.
27. P. G. C. Martin—Lancet 2, 1943, 605.
28. Lancet 2, 1941, 197.
29. H. Bailey—Surgery of Modern Warfare—1942, Vol. 1., p. 420.
30. A. R. Thomas—Brit. J. Radiol. 14, 403, 1941.

Features

C. A. F. MOES, Editor

MEDICAL SOCIETY NOTES

Thanks to the co-operation of the former executive, the Society this year was able to set out upon its course of activities with some semblance of financial security, and during their term of office, the active members, by close management and hard work, maintained this position.

The subsidiary organizations received support as in the past, and this year the Society played host to an open meeting for the discussion of a health bill proposed by C.A.M.S.I. During the course of the year, the financial plight of the Medical Athletic Association received much attention from the Society. It was decided that the Athletic Association must have

greater support in order to function successfully. Since the onus of the support falls on the Society, attempts were made to increase the budget of the Society by means of a larger grant per student per year. It is hoped that the future executive will find it possible to put the above plan into action.

The gloomy financial histories of past executives, plus the well known fact that this Society receives the smallest budget of any on the campus, bears witness of the need of immediate action to bring about the proposed change.

JACK FINLEY,
Treasurer Medical Society.

— Or —

Here Come Those Damned Students Again!

"Would you mind, Mr. Walsh", asked Doc Rykert today

"If a clinic we held 'round your bed?

It would help the boys out

And remove every doubt

When they judge 'twixt the Quick and the Dead".

So what could I do but agree with the "Doc",

That perhaps I could help in his plan

I'd uncover my past

Nor let out a blast

If they poked at my poor diaphragm.

They gathered the students from far and from near

And scheduled the meeting for nine

Half the students were late

When they rushed through the gate

And tried to "break" into the line.

The Doctor was sorry for those who were late
 And sorry to break up their sleep
 He said not to worry
 And never to hurry
 But NEXT TIME to travel by Jeep.

And then they got started on me, "Patient" Walsh
 And poked at my liver and spleen
 And said that I oughta
 Cut down on my water
 And trade off some fat for some lean.

"Now sit up in bed will you please Mr. Walsh
 And say "99" so we'll hear
 It has to be done
 And I guess you're the one
 And besides, you have nothing to fear.

"Well, Mr. Rubinstein, what do you say
 Let's have your opinion right here!"
 Said "Ruby", "It's Cholic
 I think Diastolic
 And comes when one drinks too much beer!"

"Mr. Steinberg, do you think that you could agree
 With Rubinstein's keen commentary
 Or would you suggest
 A pain in the chest
 Would take Walsh to the Cemetery?"

Mr. Steinberg was silent a moment or two
 When he answered it sounded quite gleeful
 And he said "No, you see
 He's got water on knee
 And I think I would say quite a kneeful!"

"Now how," asked the Doctor of one student Brown
 "Can you tell if he's a watery abdomen?"
 "Well it's never failed yet
 One gurgles if wet"
 Said Brown as he whistled Loch Lomond.

"Would you care, Mr. Krakhauer to venture a thought
 Or does asking opinions appal you?"
 Said Krakhauer, so young
 "It's on tip of my tongue
 If I think of the name I will call you!"

They gave their opinions did Langer and Rossman
Concurred in by bright Sydney Rosen
 'Til Doc in despair
 Tore his now thinning hair
And faced them with countenance frozen.

"That'll do", he says quick, "it's enough for today
We'll not bother with Slemmon or Little
 Perhaps I've been rough
 But enough is enough!"
And Lazerson choked on some spittle.

Poor Dr. Rykert bowed down his tired head
And dismissed all the class with a prayer
And said: "If you boys will excuse me
I'll go out and get some fresh air!"

The writer, that's I, I'm still living
'Though somewhat with students I'm bored
But poor Dr. Rykert strong soul though he was
Has gone to his final reward.

(OLEO) LEO J. WALSH

A long suffering patient at the hands of medical students in T.G.H.

Abstracts

M. ST. AUBIN, Editor

Contributors

T. Y. Chang

H. Kalant

R. W. Lamont Havers

Surgery I

The Use of Thiouracil in Hyperthyroidism

Arnold S. Jackson, M.D.

American Journal of Surgery,
March, 1945.

The use of thiouracil in the treatment of hyperthyroidism has been debated owing to the numerous controversial results observed clinically. The author in this article analyzes the clinical reports of preceding authors and presents his 10 illustrative cases before forming his conclusions as to the relative merits of this drug.

The dosage of thiouracil as used by workers in this field varies from 0.1—0.8 gms. daily and since there is no uniformity of agreement the dosage recommended by the writer is 0.2—0.4 gms. daily to be taken for a period of 3-4 weeks and the dosage may be altered slightly by such factors as age, duration and severity of symptoms, the type of hyperthyroidism and progress. Clinical improvement is observed in the majority of patients and this usually precedes a fall in the B.M.R. However, complications which have followed the use of this drug are nausea, vomiting, hyperpyrexia, morbilliform rashes, urticaria, vertigo, edema of leg and even death from agranulocytosis.

Despite these deleterious effects the fact that 83% of patients are improved

by administration of thiouracil justifies further clinical experience along this direction. Routine check up of patients white blood count as well as their general condition every 2 weeks is advised to protect patient from agranulocytosis. Prolonged use of thiouracil in an attempt to cure hyperthyroidism has not been found to be particularly useful but the use of thiouracil as pre-operative measure is just as good as and in certain specific instances superior to Lugol Iodine. Combination of thiouracil and Lugol Iodine is now being used both pre and post-operatively and this form of treatment has much to do with the diminution of toxic reactions and hence reducing the operative risk in hyperthyroidism. Surgery remains as the best form of treatment from the viewpoint of a permanent curative measure.

T. Y. C.

Surgery II

Peptic Ulcer in the Canadian Army (1940 to 1944)

Major W. R. Feasby

War Medicine, Vol. 6, No. 5, p. 300,
November 1944

The medical profession and the public, alike, have gained the impression that dyspepsia and peptic ulcer are the main cause of disability in this war, and that those engaged in military service are more

liable to the development of these disabilities than people in civilian occupations. In direct contrast to such views, the facts are that gastro-intestinal complaints of this category comprise only 1-3% of all military hospital practice, and that there is no evidence to indicate a higher incidence among troops than among civilians of comparable age and sex. No basis exists for a reliable comparison of the incidence in this and previous wars.

In the examination of recruits, the detection of peptic ulcers, and their differentiation from functional dyspepsia, malingering, and mental defect, present a considerable problem. Factors of importance in the diagnosis are briefly outlined. No man with active ulceration, or evidence of former perforation, haemorrhage or scarring, is accepted for service. A 12% error, in diagnosis of peptic ulcer among recruits, has been the record up to the present.

Among 235 peptic ulcers discovered in patients in service, there were 19 gastric ulcers, and the remainder were duodenal. All were treated by conservative measures in the usual manner, as outlined briefly in the paper. Some required subsequent surgical treatment, but no note is made of the number of such cases, or the type of surgery. 46 members of the group developed complications, ranging from gross haemorrhage, to stomach ulcers, to super added functional complaints.

Attempts were made to return men with healed ulcers to active duty. In the case of those with gastric ulcers, all attempts were successful. In the case of those with duodenal ulcers, a small group has been able to return to full duty, in England, indefinitely. An additional group, chiefly of officers and N.C.O.'s has been able to continue on duty in Canada,

by virtue of special diet and controlled environment. These two groups together total about 10% of the whole group of patients.

H. K.

Medicine I

The Mechanism of Renal Complications in Sulfonamide Therapy

Edwin L. Prien, M.D.

The New England Journal of Medicine
January 18th, 1945, Volume 232 No. 3

Despite an increasing experience and use of more soluble drugs renal complications to sulfonamide therapy continues to occur. The author believes that these complications may be produced either by obstruction of the urinary channels by insoluble concretions composed principally of the acetyl derivatives of the drug, or less frequently, by a toxic injury of the tubules independent of concretions.

The most important factor in the causation of these complications is stated to be a lowered urinary output.

He believes the obstructive type of lesion to depend on the hydrodynamics of the urinary tract and to the affinity of crystals to each other. Crystals of the sulfonamides first form in the convoluted tubules, where reabsorption of water occurs. Sedimentation of these segregated crystals occurs in the terminal portion of collecting tubules and in the renal calyces. Proximity of the crystals here results in aggregation and formation of concretions that obstruct the terminal portion of the collecting tubules. This process then progresses in a retrograde manner up the collecting tubules. Calyxeal concretions remain in situ or pass down the ureter much as the ordinary urinary calculi.

In the toxic type of injury 'the only lesion demonstrable in the urinary tract is widely disseminated focal necrosis of the kidney tubules with interstitial oedema. Often no crystals or concretions in the kidney or entire urinary tract can be demonstrated.

Two cases with toxic renal damage are reported, one coming to autopsy, the other recovered after renal decapsulation at which time a cortical biopsy was taken.

R. L-H.

Medicine II

The Value of the Weltmann Serum Coagulation Reaction for the Diagnosis of Certain Forms of Neoplastic Disease

M. Wachstein, M.D.

The Journal of Laboratory and Clinical Medicine

January 1945, Volume 30, No. 1

The Weltmann serum coagulation reactions shows a marked left shift in a large majority of patients with malignant neoplasm. This is particularly true when the lesion is in the gastro-intestinal tract. When, however, the lesions are in the lung, breast, female genital organs, or the prostate, the test is of little help in differentiating malignant from similar benign neoplastic or inflammatory conditions. When ascites exist and is not a complication of previous cardiac, renal, or tuberculosis disease, a shortening of the coagulation band is suggestive of carcinomatosis, while a lengthened coagulation band is suggestive of cirrhosis of the liver. A very marked shortening of the coagulation band is also found in the majority of patients in whom neoplastic involvement of bone is present. The

author suggests that an unexplained shortened coagulation band, not explained by clinical findings, should always suggest that a thorough examination of the skeleton be made.

R. L-H.

Medicine III

The Present State of the Treatment of Uncomplicated Duodenal Ulcer

C. G. Morlock

Proceedings of the Staff Meetings of the Mayo Clinic

September 1944

The paper describes the importance of proper treatment of duodenal ulcer in war-time and in the postwar period. The fact that the duodenal ulcer which in the majority of cases can be cured medically goes on, due to inadequate treatment, to a position where it can be rectified only by surgical measures, is deplored. Uncomplicated duodenal ulcer, it is pointed out is a medical problem.

A list of those patients eligible for medical treatment is given:

1. Uncomplicated ulcer—only present for a short time.
2. Patients under 30 years.
3. Older patients and mild symptoms.
4. Patients where surgery is contraindicated.
5. Psychoneurotics in whom ulcer uncomplicated.

A discussion ensues of the proper evaluation of the factors which promote chronicity of lesion.

(a) Neurogenic factor—this is in the opinion of the writer the most important single etiologic factor. The symptoms associated are described. This should be considered in treatment.

(b) Chemical factor—this is to be

treated in the traditional manner of neutralisation, but also the psychic factors if readjusted may lead to a decrease of acid secretion.

(c) Co-operation of the patient—full co-operation of the patient is essential for complete success of the program.

The principles of treatment are given and the advantage of hospital treatment, where regulation of dietary and medical therapy can be carried out, are stressed.

The paper is completed by a description of prevention of recurrence.

M. S. A.

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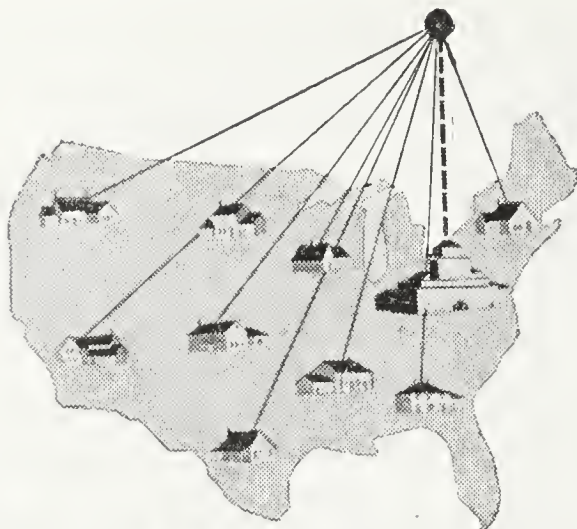
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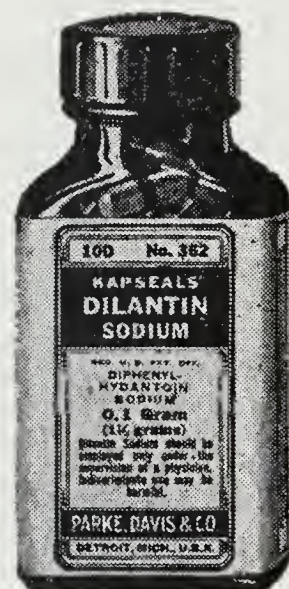
Management of the epileptic in the home demands the use of therapeutic measures which will control seizures effectively, and favorably influence such psychological factors as make for better adjustment of the patient to family life, as well as to his association with others. The objective of the physician is to make it possible for the epileptic, adult or child, to live a normal life with his family.

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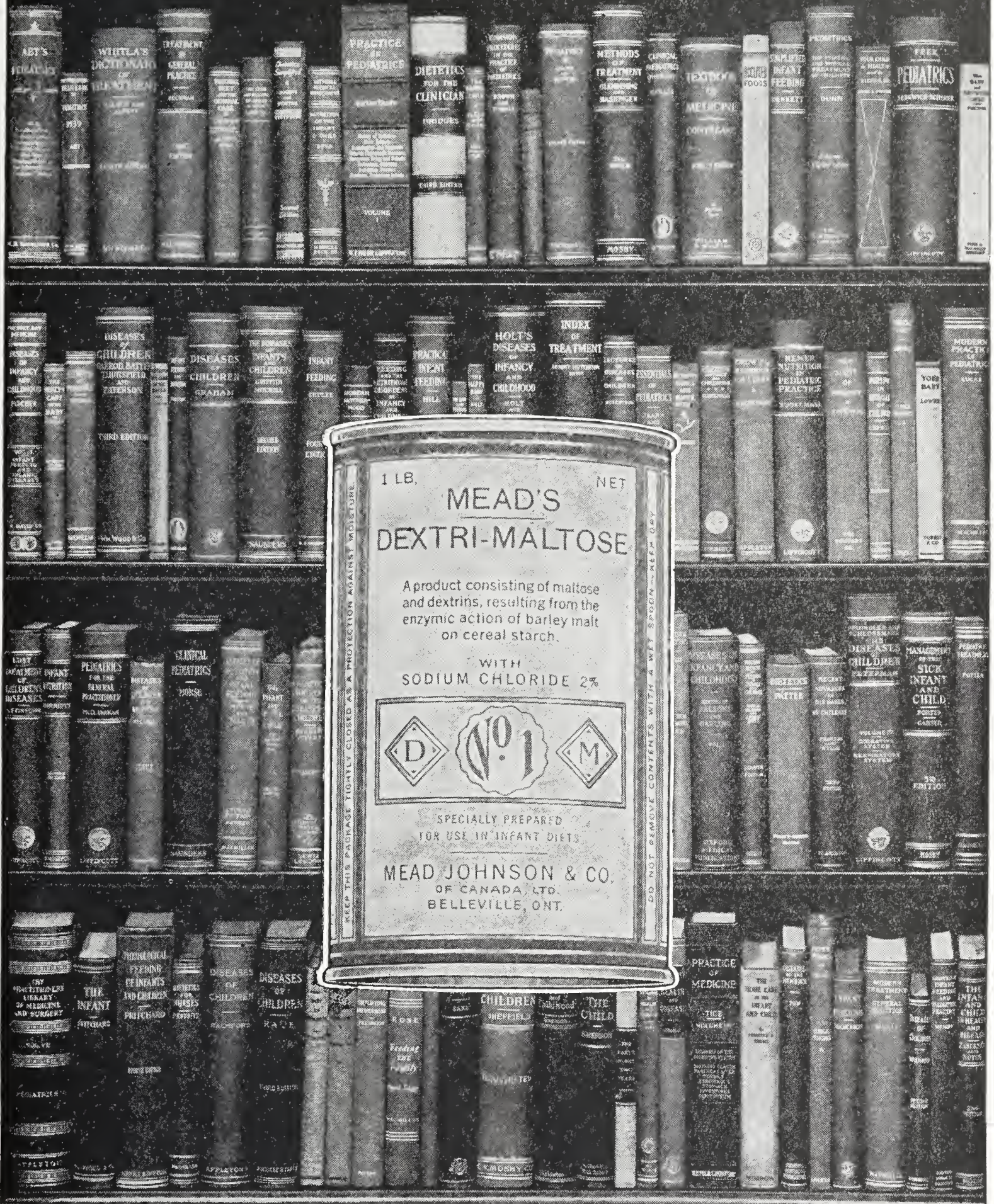
1. Tracy Putnam: Convulsive Seizures, p. 4, J. B. Lippincott Co., 1943.

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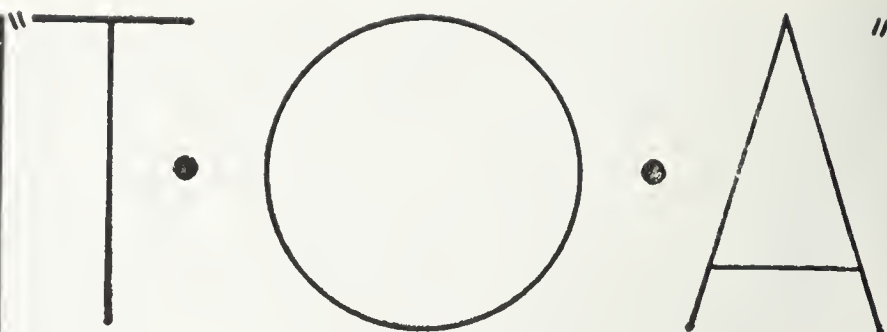
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*R. H. Follis, D. Jackson, M. M. Eliot, and E. A. Park: Prevalence of rickets in children between two and fourteen years of age, *Am. J. Dis. Child.* 66:1-11, July 1943.

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